

ABSTRACT

A tilt-compensated electronic compass can be realized by calculating rather than measuring Earth's magnetic field component Z in a direction orthogonal to the two measurement axes of a 2-axis magnetic sensor. The orthogonal component Z can be
5 calculated using a stored value for the Earth's magnetic field strength applicable over a wide geographic region. The calculation also requires using measured field values from the 2-axis sensor. Once Z is known, and using input from a 2-axis tilt sensor, compensated orthogonal components X and Y can be calculated by mathematically rotating the measured field strength values from a tilted 2-axis sensor back to the local
10 horizontal plane. Thus, a very flat and compact tilt-compensated electronic compass is possible.